CHAPTER 15

Touch in Parent-Infant Mental Health

Arousal, Regulation, and Relationships

Mark Ludwig, M.S.W., L.C.S.W.
Tiffany Field, Ph.D.

In this chapter, we highlight the case for presenting touch and other nonverbal interactions as essential areas for infant research and intervention. Most parent-infant research has focused on nontactile forms of nonverbal communication, including gaze, prosody of speech and "motherese" (Stern 1985), and parent-infant communication rhythms (Beebe et al. 2000). Although attention has been given to the effects of touch and touch deprivation on infant regulation and social-emotional development (Stack and Jean 2011), basic touch research and touch intervention remain underdeveloped (Field 2000, 2001; Hertenstein 2011).

The Context of Touch: Regulatory Processes in Dynamic Developmental Systems

A central premise of parent-infant mental health theory is that human behavior and development can best be understood in terms of dynamic bioregulatory, neurological, psychological, cognitive, motoric, and relational systems in complex interaction (Fogel 2011; Sander 2008; Tronick 2007). Infant behavior in particular is a meaningful, organized "assembly of functional organizations" (Rochat 2001). The nonverbal nature of this earliest developmental period highlights the centrality of touch in communication and regulation at all levels: touch and touch interactions are crucial at these various organizational levels during the critical period from birth to age 3 years. Much research has focused on state regulation processes in the infant-parent relationship: during this early period, the

dynamic, fundamental triad of *arousal-regulation-relationship* is at the core of development. In adequate infant care, arousal is regulated as the infants' psychobiological systems are collaboratively supported by the sensitive ministrations and attuned attention of the caregivers. In the first 6 months and throughout the early years, touch is the most potent form of arousal regulation (Feldman et al. 2010; Ferber et al. 2008).

First Sense That Organizes Self, Other, and World

Touch is the human infant's first learning modality, shaping experience even during the prenatal period. The infant's tactile sense develops from the first gestational week onward, and is the most advanced sense at birth. It underlies the organism's growing awareness of itself and the environment. Prenatal sensorimotor, proprioceptive, and tactile discrimination systems are thought to develop through the touch stimulation provided by fetal movement, push-back pressure from the elastic uterine wall, self-contact between body parts requiring coordinated movements of the limbs and head, and touching of the pulsing umbilical cord (Mori and Kuniyoshi 2010; Sann and Streri 2008). Body learning, self-organizing schemata, and behavioral patterns may first emerge from the dynamic interaction of the developing fetal nervous systems and the uterus, fluid movement, and self-touch.

Importance of Touch for Adequate Development

The human infant cannot develop adequately without receptive and active touch experience. The parent-infant "love affair" that guarantees early survival and stimulates and supports subsequent development is rooted in the mutual attraction and gratification of babies' and caregivers' feeling each other's skin, warmth, movements, and the like. This mutuality has an intrinsic, evolutionary underpinning. For example, the particularly smooth and soft skin of the infant is universally perceived as a pleasant tactile experience for the toucher (Guest et al. 2009). The skin and body of the neonate are richly endowed with touch and pressure receptors whose stimulation begins a cascade of healthful, interrelated biological and psychological processes (Field 2001).

Physiological Benefits of Touch Interaction in Early Development

Numerous studies indicate both the healthful benefits of touch and the effectiveness of touch in relieving psychological and physiological distress. Extensive animal studies with mammals (Suchecki et al. 1993) have explored the long-term social and neurological benefits of adequate contact, grooming, and licking. Suchecki et al. (1993) found that maternal

regulation of the infant's hypothalamic-pituitary-adrenal axis through touch and nursing occurred at multiple levels. Other studies have documented positive physiological and biochemical effects of touching (Weiss 2000), including decreases in infant blood pressure and heart rate, as well as decreased cortisol levels and increased oxytocin and prolactin levels (Feldman et al. 2007; Uvnas-Moberg and Peterson 2005). In a study comparing skin-to-skin sleeping with maternal separation sleeping, Morgan et al. (2011) used heart rate variability data monitoring with full-term neonates and reported "a 176% increase in autonomic activity and an 86% decrease in quiet sleep duration during separation compared with skin-to-skin contact" (p. 817).

Neurological, Neuroendocrinological, and Autonomic Aspects of Touch

Humans are genetically and biologically organized to seek, exchange, process, and use touch interactions to establish relationships, for regulation, and for social and personal communication. Regarding the role of behavioral chemistry in parent-infant touch interaction, Weller and Feldman (2003) surveyed the role of cholecystokinin and opioid peptides in early contact interactions and bonding in animals and the suspected role of these touch-induced agents in emotion regulation in infants in the context of separation, contact, and attachment processes. They found that postnatal touch was a crucial factor in maintaining regulatory balance and helped to reduce risk factor–induced emotional dysregulation.

The work of Stephen Porges (2001, 2011) has generated a great deal of interest in the functional evolution and developmental complexity of the vagal systems by showing how social engagement is an evolving, active force in interpersonal neurobiological regulation. Notably, low vagal tone has been found to be associated with impaired post-stress re-regulation (Degangi et al. 1991). However, proximity, cuddling, touch, and safe interpersonal interactions support vagal tone regulation. Vagal tone increases immediately after massage therapy sessions and across repeated sessions of massage therapy (Diego et al. 2007). This likely happens via the stimulation of dermal and subdermal pressure receptors that are innervated by vagal afferent fibers, which ultimately project to the limbic system in the brain, including hypothalamic structures involved in autonomic nervous system regulation and cortisol secretion. This vagal activity–touch interaction likely coordinates touch-based forms of interactive psychobiological regulation with eye contact, auditory communication, emotional matching, and other forms of rhythmic caregiver-infant interactions (Tronick 2007).

Psychological and Emotional Functions of Interactive Touch

Adequate and attuned touch provides a regulatory foundation for early psychological and social-emotional development (Barnard and Brazelton 1990). As Feldman (2011) notes,

"Maternal touch...is not just one more thing mothers do: It is the basic channel for the expression of parenting and serves as the bedrock to the individual's future capacity to provide love and nourishment to future attachment relationships" (p. 374). Touch constitutes the most effective single component (Stack and Jean 2011) of the complex interpersonal, nonverbal communication system (touch, gaze, vocalizations, movement, positioning) that underlies attachment and regulation in early life. Touch alone is as effective as facial and vocal communication in calming and regulating infants in mother-infant interactions (Stack and Muir 1992).

Emotional Communication Via Touch

A growing body of research supports the innate evolutionary wisdom and parental intuition that touch communicates emotional experiences and intentions (Muir 2002). Hertenstein et al. (2002, 2006) and others have established that in adults, emotion of the toucher can be identified correctly from the simple experience of a stranger touching you on your arm. These experiments with adults found that the emotions of anger, fear, disgust, love, gratitude, and sympathy could be understood nonverbally through touch alone. More emotions could be conveyed when the senders were allowed to touch any appropriate part of the human body to convey a specific emotion (Hertenstein et al. 2009). Such innovative experiments are establishing that humans receive a great deal more emotional information through touch than was previously known (Jean et al. 2009). If caregivers are communicating their emotional states to children through touch, the necessity of heightened caregiver awareness is quite clear. If children are also communicating emotions nonverbally through their own acts of caregiver touching, then recognition and response to these communications should enhance the child's sense of himself or herself as a competent communicator. On the other hand, touch that communicates the caregiver's negative emotional states or overlooks the child's responses to touch may degrade the vitality of the child's response to touch and the child's belief in himself or herself as an effective emotional communicator via touch.

Touch Sensitivity and Touch Aversion

Touch interaction is an essential lifelong behavior that is adapted to changing human needs across the lifespan. In the beginning, touch and holding provide essential care, security, and regulation. As the child grows, touch and holding become less frequent (Green et al. 1980), are ritualized, or are sought and provided on an ad hoc basis in response to distress or as an expression of affection. Attuned bodily interactions meet the child at the somatic level and provide congruence for the earliest senses of an embodied self (Stern 1985). Although touch patterns change rapidly across the first year as the child engages the world more actively and becomes mobile, an early history of attuned touch appears to be part of an implicit relational substrate that is sustained and reflected in the reciprocity in

later communication, a feature highly correlated with effective social-emotional and affect regulation (Lyons-Ruth et al. 1990).

Research over many decades has drawn the association between affectionate and tender touch and attachment security (Ainsworth et al. 1978; Leyendecker et al. 1997). On the other hand, caregivers' or infants' touch aversions or avoidance early in life can have a profound effect on the bonding and attachment relationship with primary caregivers. When touch aversion is present, an essential and potent resource of early interactive regulation is unavailable and the child must adapt, often with some developmental cost. Genetic and constitutional factors such as temperament and parent-infant temperament "fit" may give rise to touch-aversive behaviors when there is an unfulfilled parental touch expectation for reciprocity from more apprehensive and reactive children. Preterm infants are known to develop highly sensitive sensory response schema and sensory processing disorders that may develop into lasting tactile hypersensitivities (Case-Smith et al. 1998). Touch aversion and touch sensitivity are common features of sensory integration dysfunction (Ayres 2005) and autism spectrum disorders (Tomchek and Dunn 2007), in which modulation and regulation of sensory inputs are impaired.

Feldman et al. (2004) found that children with infant eating disorders had less affectionate and more negative touch interactions and more touch rejection. Touch responses can also be affected by transitory and chronic traumatic experiences, such as early intrusive medical procedures associated with the neonatal intensive care unit (NICU) (Weiss and Wilson 2006), prolonged experience of pain, or stressful caregiving practices such as repeated use of enemas, or through milder insensitivities such as the pinching, poking, prodding, shaking, and jiggling associated with the caregiving of mothers with depressive symptoms (Malphurs et al. 1996). Finally, a robust research literature links maternal depression (Herrera et al. 2004; Weinberg and Tronick 1998) and insecurity of attachment (Ainsworth 1979) to learned touch aversion, touch avoidance, and touch deprivation.

Benefits to the Toucher in Parent-Infant Touch Interaction

Mutual physical, psychological, and emotional benefits occur for all partners in touch interactions. As stimulation of pressure receptors mediates the positive effects of massage on its "recipient" (Field 2001; Field et al. 2010), these pressure receptors are also stimulated in the hands of the person providing the massage or touch. Demonstrating the mutual or reciprocal effects of touch is a complex problem, but this coregulation paradigm may be a model for further research. Neu et al. (2009) found that the cortisol levels of mothers who held their premature infants decreased while they were holding their babies. The infants also had lowered cortisol levels after being held. Regular massage also reduced heart rate and anxiety levels in both parents and child cancer patients (Post-White et al. 2009). Parents' effective use of touch for coregulation of affect in their children may build competency and confidence in the parents and increase their sensitivity to the infants' cues (Clausen et al. 2012).

Touch Interventions

The quality and impact of touch often lie outside the toucher's immediate awareness. Parents and caregivers may touch as they were touched as children. Parent-infant mental health practitioners are keenly attentive to such nonverbal communication of transgenerational styles with caregiver-infant dyads in treatment (Champagne 2008; Fraiberg et al. 1975). In parent-infant mental health training, considerable attention is given to tracking the strength and style of dyadic nonverbal cueing and whole-body expressions of arousal states and affective tone. Methods for evaluating infant-parent interactions often include observations of patterns of touch both explicitly and implicitly. For example, the NCAST Parent-Child Interaction Feeding and Teaching Scales (Barnard 1994) represent a detailed and well-researched program that looks at infant engagement and disengagement cues and infant states that support readiness for contact, and provides a tracking system to identify parents who may be having difficulty maintaining connection to their young child's internal state and needs.

At times, parents need assistance and feedback to be able to coordinate their touch sensitively with the needs of the child. For example, Tronick (2007) found that poking, pinching, prodding, and other forms of touch are associated with misattuned parenting and chronically dysregulated dyads. Interventions that reflect current interest in parental reflective functioning (Fonagy et al. 2005; Slade 2002) and mindfulness (Siegel 2001) consider the qualities, timing, and appropriateness of touch, as well as parents' awareness of the impact of all their engagements on their child's regulation and affect in real time.

Infant-parent touch-focused interventions have been most developed in cases demonstrating a high risk of problematic medical, developmental, or psychological outcome. Parent-infant touch interventions have been used in medical and mental health centers serving families with young children (Feldman 2011; Field 2011); generally, however, pediatricians and popular parenting manuals, with few exceptions (Brazelton 1992), offer little guidance on everyday touch sensitivity to the normative parenting population.

In contrast, the potent positive impacts of sensitive and timely touch for children at risk and the negative consequences of misattuned or insufficient touch interaction have been given considerably more attention. With regard to touch with preterm and NICU babies, the Touch Research Institute (Field 2001) has conducted an active program of touch research and intervention since 1992. Preterm infant massage has been an area of special focus. Preterm infants receiving moderate-pressure massage may show fewer stress behaviors, as was noted in a study by Field et al. (2006). Compared with the light-pressure massage group, the moderate-pressure group gained significantly more weight per day and, during the behavior observations, showed significantly lower increases in 1) active sleep, 2) fussing, 3) crying, 4) movement, and 5) stress behavior (hiccupping). Babies in the moderate-pressure group also showed a smaller decrease in deep sleep, a greater decrease in heart rate, and a greater increase in vagal tone. All of these changes suggest a decrease in general arousal, which, in turn, may explain improved immune function in preterm neonates. When conducted by parents, these early touch experiences support the devel-

opment of attachment and bonding, connection points that are often stressed when parents cannot find direct means to help their hospitalized children.

There have also been noteworthy interventions targeting attachment and interpersonal regulation in the parent-infant dyad. Touch interventions that support emotional attunement and secure attachment patterns target the development of the sensitive interpersonal skill thought to be essential in the parent's scaffolding of a child's long-term achievement of affect and impulse regulation. The Fostering Mindful Attachment program (Cooper et al. 2008) was designed to bring infant-parent mental health services to children from birth to age 1 year and their parents in residential substance abuse treatment using parent-infant massage as a platform for supporting attunement and early attachment processes. In this program, caregivers learn to track their infant's response to qualities of touch interactions and develop new capacities to recognize and attend to their own internal states of arousal. Facilitators' interventions are aimed at cognitive, emotional, sensory, relational, motor, and arousal patterns. Ongoing research (Clausen et al. 2012) shows trends toward higher knowledge of infant development and lower parenting stress after completion of the intervention program. Following the intervention, participants more often perceived their children as less difficult and easier to understand.

Conclusion

In this chapter, we have presented an integrated perspective on touch and touch-focused interventions in early development and on current infant-parent mental health clinical theory and practice. Current research is beginning to call attention to what human bodies have always known: touch is an essential element in shaping development, including neurophysiological functioning and the overall sense of self. Still, insufficient attention has been paid to the meaning and effects of touch. Touch still appears to be "the neglected sense" relative to the other senses.

We have looked at the physiological, neurological, and endocrinological benefits of touch interaction in early development, along with the consequences of touch deprivation and the possible mechanisms behind touch aversion. Finally, we have discussed general principles for working with touch in parent-infant dyads and, more specifically, touch interventions for infants and parent-infant dyads at risk. The emerging evidence indicates that continued efforts to understand the foundational effects of touch and touch interactions and to develop interventions based on these understandings may be very fruitful. Practice models that understand the complex tactile needs of the child should be considered as part of holistic professional interventions and parenting education programs.

KEY POINTS

- Touch is the human infant's first learning modality, shaping experience even before birth. Caregiver-infant touch is a complex psychophysiological interaction

that impacts multiple neurological and biological systems in both the child and the caregiver. Touch is the most effective single intervention for regulating the neurological and affective systems of infants and young children.

- Affectionate and tender touch is associated with attachment security, whereas caregivers' or infants' touch aversions or avoidance early in life can negatively impact the dyadic relationship with primary caregivers (including attachment). When touch aversion is present, an essential and potent resource of early interactive regulation is unavailable and the child must adapt, often with developmental cost.
- Touch aversion, touch avoidance, and touch deprivation in children have been associated with insecure attachment, maternal depression, preterm birth, transitory and chronic traumatic experiences (e.g., intrusive medical procedures, neonatal intensive care, prolonged pain, repeated enemas), and insensitive caregiving (e.g., pinching, poking, prodding, shaking, jiggling).
- Positive physical, psychological, and emotional benefits occur for both partners in touch interactions, including lower cortisol levels, reduced heart rate, and lower anxiety levels. Parents' effective use of touch for coregulation of affect in their children may build competency and confidence in the parents and increase their sensitivity to the infants' cues.
- Parents and parent educators may want to focus on the development of caregiver reflective capacity regarding their own emotional and autonomic arousal during touch interactions, because recent research indicates that touch may communicate emotional experiences and intentions.

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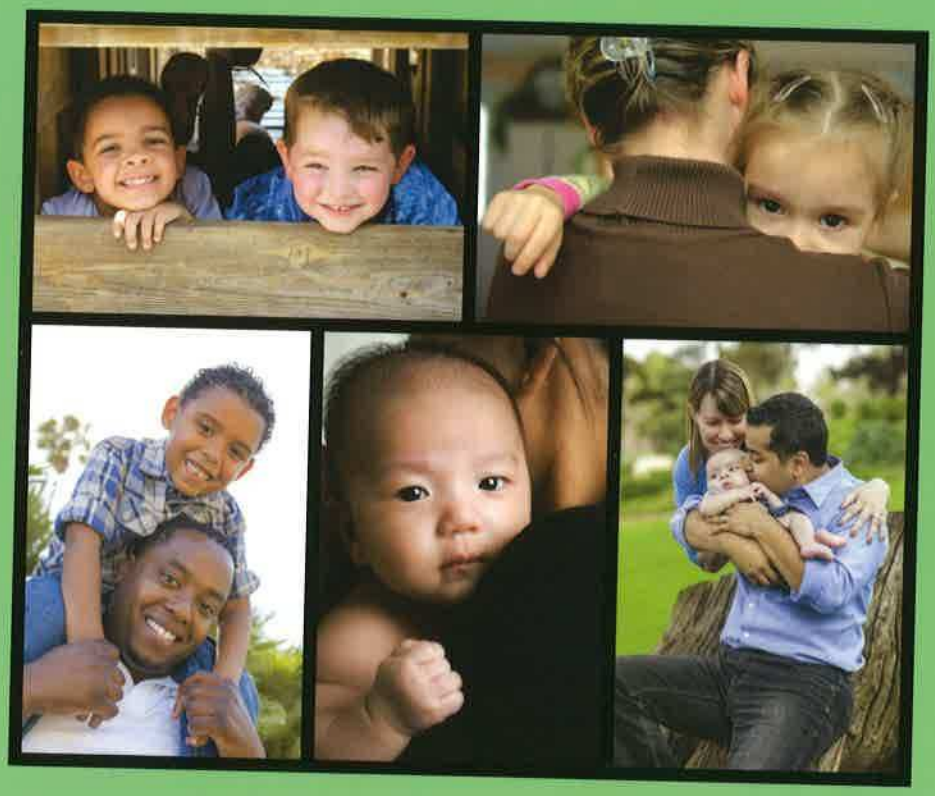

Edited by

Kristie Brandt, C.N.M., D.N.P.
Bruce D. Perry, M.D., Ph.D.
Stephen Seligman, D.M.H.
Ed Tronick, Ph.D.

Foreword by

T. Berry Brazelton, M.D.